

REMARKS

Applicant thanks the examiner for his attention to the application. Applicant has considered the cited references and amended the claims to forms believed distinguishable thereover.

Claims 1, 2, 4-6, 9, 10, 12-16, 19 and 20 are pending in the application. All claims have been rejected under the art. Claims 1, 4, 7, 9, 12, 15, 19 and 20 stand rejected as being anticipated under 35 USC §102 by Leach (2,976,918). Claims 1, 2, 4-6, 9, 10, 12-16, 19 and 20 stand rejected as being obvious under 35 USC §103 over Leach in view of Schubach (4,797,089).

Leach is cited for showing a housing 12 having a liquid containing interior which also contains oil containing conduits 34, 39 and the purpose of which assembly is to heat oil circulated by pump 54 with water circulated by pump 70. The heated oil is supplied to an undisclosed burner 100 of an undisclosed furnace 101.

In effect, Leach discloses a tubular housing 12 that contains discrete lengths of conduits 34 and 39. The housing 12 is displaced from the burner 100 and is not intended to be a part of the burner/furnace assembly. The distributed arrangement of the plumbing and control particularly teaches Leach's foregoing intention. See also the redundant pre-heater assembly 78, wherein surplus oil is stored in tank 79 and the tank is heated with a separate gas-fired burner 84.

Schubach is cited for showing an oil pre-heating device with an oil-atomizing nozzle 26. Schubach discloses a pressurized air system at Figure 1 that operates with nozzle 33 and a pressurized oil system at Figure 2 that operates with nozzle 35.

In Schubach's air system, air is supplied via an external conduit 29, couplers 22 and 18 and a bore 19 to a forward region of a nozzle filter chamber 20 (col. 6, lines 57-59). The chamber 20 is mounted forward of a heat transfer assembly 12 that is intended to only heat the oil (col. 10, line 61- col. 11, line 40). The air is admitted to the forward portion of the chamber. Oil is directed to a rear portion 16 of the chamber 20 behind O'ring 36, but can collect in the forward portion until heat is required as sensed by the system thermostat. The air pump is then activated which forces the oil through the nozzle 33. chamber 20 upon the nozzle (col. 9, line 23-col. 10, line 34).

The heat transfer assembly 12 comprises a bored aluminum core piece 34 that supports an electrical cartridge heater 42 in a bore 44. Oil is passed through a helical passageway 15 in the space between an outer sleeve 43 and the bore 44 and heated. An extension piece 34a includes the filter chamber 20 is displaced and passageways 17 and 32 which transfer the oil to the extended chamber portion 16. At no time is the air directed through any passageway that is intended to be heated by the heater 42. Instead the air is directed immediately adjacent the air inlet channels 37 at the nozzle 33.

In short, Schubach relies on an electrical heating cartridge 42 and nowhere discusses or contemplates the alternative use of a heated liquid. The adaptation of a heated liquid, as suggested by the examiner, to Schubach's assembly 12 would therefore require significant modifications, re-design and undue experimentation that negates the obviousness of the substitution argued by the examiner.

Moreover, nowhere does Leach and/or Schubach alone or in combination disclose or suggest providing passageway(s) to heat air used to atomize the heated oil and especially not within a manifold as described and claimed by applicant.

In contrast to Leach and/or Schubach, applicant provides a pre-heater assembly 1 that mounts immediately adjacent an oil distribution nozzle to provide a heated fuel immediately at the point of combustion. The thermal conductivity of applicant's manifold body is such that heat is readily transferred from the liquid to the oil and air. The manifold body also provides convoluted oil directing passageway(s) 20-26 (fig. 5), heated liquid passageway(s) 30-32 (fig. 3) and air passageway(s) 40-42 (figs. 3,4) whereby increased surface areas are provided to facilitate efficient heat transfer to the oil and air.

The passageways are also provided in tiers. The oil directing passageway(s) 20-26 are provided at a lower level that lies parallel to and directly adjacent the heated liquid passageway(s) 30-32. The riser 25 also extends through the level containing the heated liquid passageway(s) 30-32.

The air passageway(s) 40-42 extend parallel to and adjacent the heated liquid passageway(s) 30-32 (fig. 4). The passageway portions 41 are necked down and include an unnumbered obstruction (fig. 3) to compress the air passing through the passageway(s) 40-42. As noted at the specification,

"Compressed air enters compressed air channel 40 and is heated by heat energy transferred from heated liquid channels 30, 31 and 32 to preheat device 1 as it passes through compressed air channels 41 and 42 to nozzle 2."

No such passageways are provided at either Leach or Schubach.

Moreover, the passageway(s) 40-42 are located to facilitate the alternative use of a high-pressure oil nozzle. In the latter instance, the mounting of the high-pressure oil nozzle is such that the channel 41 is blocked and because the nozzle doesn't provide

atomizing ports, oil is prevented from leaking from the air passageways 40-42. Schubach in contrast and when he uses his oil nozzle 35, uses conduit 29 as a return line (fig. 2 and col. 9, lines 8-22) in concert with solenoid 30.

The foregoing distinctions are particularly provided for at the amended independent method claim 21 and apparatus claims 24, 33 and 35. That is, each claims a manifold having internal passageways that can couple to sources of oil, heated liquid and air. At claims 22-34, 38 and 39, oil discharge and atomizing port(s) at the nozzle are aligned to the first and third passageways. The manifold and passageways are configured in all claims such that heat from the heated liquid is transferred to heat the oil and air immediately prior to being discharged from the nozzle. Where the nozzle doesn't include an atomizing port (i.e. claims 35-37), the nozzle blocks the third passageway. Where the nozzle includes an atomizing port and a source of air is coupled to the third passageway, the air is also heated and atomizes the hot oil as it is discharged from the nozzle.

With the foregoing amendments to the claims, the application is believed distinguishable over the art and in a condition for allowance. No new matter has been entered with any of the foregoing amendments. Applicant requests the examiner's reconsideration of the application and an early notice to the allowance thereof.

If any matters remain that can be handled with a telephone conference, the examiner is encouraged to contact the undersigned.

Respectfully submitted,

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